

Dell™ Precision™ M4600 Owner's Manual

Regulatory Model P13F
Regulatory Type P13F001



Notes, Cautions, and Warnings



NOTE: A NOTE indicates important information that helps you make better use of your computer.



CAUTION: A CAUTION indicates potential damage to hardware or loss of data if instructions are not followed.



WARNING: A WARNING indicates a potential for property damage, personal injury, or death.

Information in this publication is subject to change without notice.

© 2011 Dell Inc. All rights reserved.

Reproduction of these materials in any manner whatsoever without the written permission of Dell Inc. is strictly forbidden.

Trademarks used in this text: Dell™, the DELL logo, Dell Precision™, Precision ON™, ExpressCharge™, Latitude™, Latitude ON™, OptiPlex™, Vostro™, and Wi-Fi Catcher™ are trademarks of Dell Inc. Intel®, Pentium®, Xeon®, Core™, Atom™, Centrino®, and Celeron® are registered trademarks or trademarks of Intel Corporation in the U.S. and other countries. AMD® is a registered trademark and AMD Opteron™, AMD Phenom™, AMD Sempron™, AMD Athlon™, ATI Radeon™, and ATI FirePro™ are trademarks of Advanced Micro Devices, Inc. Microsoft®, Windows®, MS-DOS®, Windows Vista®, the Windows Vista start button, and Office Outlook® are either trademarks or registered trademarks of Microsoft Corporation in the United States and/or other countries. Blu-ray Disc™ is a trademark owned by the Blu-ray Disc Association (BDA) and licensed for use on discs and players. The Bluetooth® word mark is a registered trademark and owned by the Bluetooth® SIG, Inc. and any use of such mark by Dell Inc. is under license. Wi-Fi® is a registered trademark of Wireless Ethernet Compatibility Alliance, Inc.

Other trademarks and trade names may be used in this publication to refer to either the entities claiming the marks and names or their products, Dell Inc. disclaims any proprietary interest in trademarks and trade names other than its own.

2011-06

Rev. A00

Contents

Notes, Cautions, and Warnings	2
1 Working on Your Computer	9
Before Working Inside Your Computer.....	9
Recommended Tools.....	10
Turning Off Your Computer.....	11
After Working Inside Your Computer.....	11
2 Secure Digital (SD) Card	13
Removing The Secure Digital (SD) Card.....	13
Installing The Secure Digital (SD) Card.....	13
3 ExpressCard	15
Removing The ExpressCard.....	15
Installing The ExpressCard.....	15
4 Battery	17
Removing The Battery.....	17
Installing The Battery.....	17
5 Subscriber Identity Module (SIM) Card	19
Removing The Subscriber Identity Module (SIM) Card.....	19
Installing The Subscriber Identity Module (SIM) Card.....	20
6 Bluetooth Card	21
Removing The Bluetooth Card.....	21
Installing The Bluetooth Card.....	22
7 Base Cover	23
Removing The Base Cover.....	23

Installing The Base Cover.....	24
8 Keyboard Trim.....	25
Removing The Keyboard Trim.....	25
Installing The Keyboard Trim.....	26
9 Keyboard.....	27
Removing The Keyboard.....	27
Installing The Keyboard.....	29
10 Optical Drive.....	31
Removing The Optical Drive.....	31
Installing The Optical Drive.....	32
11 Hard Drive.....	33
Removing The Hard Drive.....	33
Installing The Hard Drive.....	35
12 Wireless Local Area Network (WLAN) Card.....	37
Removing The Wireless Local Area Network (WLAN) Card.....	37
Installing The Wireless Local Area Network (WLAN) Card.....	38
13 Wireless Wide Area Network (WWAN) Card.....	39
Removing The Wireless Wide Area Network (WWAN) Card.....	39
Installing The Wireless Wide Area Network (WWAN) Card.....	40
14 Primary Memory.....	41
Removing The Primary Memory.....	41
Installing The Primary Memory.....	42
15 Secondary Memory.....	43
Removing The Secondary Memory.....	43
Installing The Secondary Memory.....	44

16 CPU Fan	45
Removing The CPU Fan.....	45
Installing The CPU Fan.....	46
17 Graphics Card Fan	47
Removing The Graphics Card Fan.....	47
Installing The Graphics Card Fan	48
18 Coin-Cell Battery	49
Removing The Coin—Cell Battery.....	49
Installing The Coin—Cell Battery.....	50
19 Palm Rest	51
Removing The Palm Rest.....	51
Installing The Palm Rest.....	56
20 CPU and Heatsink	57
Removing The CPU Heatsink.....	57
Installing The CPU Heatsink.....	58
21 Processor	59
Removing The Processor.....	59
Installing The Processor.....	60
22 Graphics Card Heatsink	61
Removing The Graphics Card Heatsink.....	61
Installing The Graphics Card Heatsink.....	63
23 Graphics Card	65
Removing The Graphics Card.....	65
Installing The Graphics Card.....	66
24 ExpressCard Module	67
Removing The ExpressCard Module.....	67

Installing The ExpressCard Module.....	68
25 Input/Output Board.....	69
Removing The Input/Output Board.....	69
Installing The Input/Output Board.....	70
26 DC-in Jack.....	71
Removing The DC-in Jack.....	71
Installing The DC-in Jack.....	73
27 Display Assembly.....	75
Removing The Display Assembly.....	75
Installing The Display Assembly.....	79
28 System Board.....	81
Removing The System Board.....	81
Installing The System Board.....	85
29 Touchscreen Display Bezel.....	87
Removing The Touchscreen Display Bezel.....	87
Installing The Touchscreen Display Bezel.....	89
30 Touchscreen Display Panel.....	91
Removing The RGB Display Panel.....	91
Installing the RGB Display Panel.....	94
Removing The Touchscreen Display Panel.....	94
Installing The Touchscreen Display Panel.....	98
31 Display Bezel.....	99
Removing The Non-Touchscreen Display Bezel.....	99
Installing The Non-Touchscreen Display Bezel.....	100
32 Display Panel.....	101
Removing The Non-Touchscreen Display Panel.....	101
Installing The Non-Touchscreen Display Panel.....	103

33 Camera	105
Removing The Camera.....	105
Installing The Camera.....	106
34 Display Hinge Cap Tower	107
Removing The Display Hinge Cap Tower.....	107
Installing The Display Hinge Cap Tower.....	109
35 Low-Voltage Differential Signaling (LVDS) Camera Cable	111
Removing The Low-Voltage Differential Signaling (LVDS) Camera Cable.....	111
Installing The Low-Voltage Differential Signaling (LVDS) Camera Cable.....	112
Removing The RGB Low-voltage Differential Signaling (LVDS) Cable.....	112
Installing The RGB Low-Voltage Differential Signaling (LVDS) Cable.....	114
Removing The RGB Camera Cable.....	114
Installing The RGB Camera Cable.....	116
36 Specifications	117
Technical Specifications.....	117
37 System Setup	123
System Setup Overview.....	123
Entering System Setup.....	123
System Setup Menu Options.....	123
38 Diagnostics	137
Device Status Lights.....	137
Battery Status Lights.....	137
Diagnostics.....	137
39 Contacting Dell	141
Contacting Dell	141

Working on Your Computer

1

Before Working Inside Your Computer

Use the following safety guidelines to help protect your computer from potential damage and to help to ensure your personal safety. Unless otherwise noted, each procedure included in this document assumes that the following conditions exist:

- You have performed the steps in Working on Your Computer.
- You have read the safety information that shipped with your computer.
- A component can be replaced or--if purchased separately--installed by performing the removal procedure in reverse order.

 **WARNING:** Before working inside your computer, read the safety information that shipped with your computer. For additional safety best practices information, see the Regulatory Compliance Homepage at www.dell.com/regulatory_compliance.

 **CAUTION:** Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow the safety instructions that came with the product.

 **CAUTION:** To avoid electrostatic discharge, ground yourself by using a wrist grounding strap or by periodically touching an unpainted metal surface, such as a connector on the back of the computer.

 **CAUTION:** Handle components and cards with care. Do not touch the components or contacts on a card. Hold a card by its edges or by its metal mounting bracket. Hold a component such as a processor by its edges, not by its pins.

 **CAUTION:** When you disconnect a cable, pull on its connector or on its pull-tab, not on the cable itself. Some cables have connectors with locking tabs; if you are disconnecting this type of cable, press in on the locking tabs before you disconnect the cable. As you pull connectors apart, keep them evenly aligned to avoid bending any connector pins. Also, before you connect a cable, ensure that both connectors are correctly oriented and aligned.



NOTE: The color of your computer and certain components may appear differently than shown in this document.

To avoid damaging your computer, perform the following steps before you begin working inside the computer.

1. Ensure that your work surface is flat and clean to prevent the computer cover from being scratched.
2. Turn off your computer (see *Turning Off Your Computer*).
3. If the computer is connected to a docking device (docked) such as the optional Media Base or Battery Slice, undock it.



CAUTION: To disconnect a network cable, first unplug the cable from your computer and then unplug the cable from the network device.

4. Disconnect all network cables from the computer.
5. Disconnect your computer and all attached devices from their electrical outlets.
6. Close the display and turn the computer upside-down on a flat work surface.



NOTE: To avoid damaging the system board, you must remove the main battery before you service the computer.

7. Remove the main battery (see *Battery*).
8. Turn the computer top-side up.
9. Open the display.
10. Press the power button to ground the system board.



CAUTION: To guard against electrical shock, always unplug your computer from the electrical outlet before opening the display.



CAUTION: Before touching anything inside your computer, ground yourself by touching an unpainted metal surface, such as the metal at the back of the computer. While you work, periodically touch an unpainted metal surface to dissipate static electricity, which could harm internal components.

11. Remove any installed ExpressCards or Smart Cards from the appropriate slots.

Recommended Tools

The procedures in this document may require the following tools:

- Small flat-blade screwdriver

- #0 Phillips screwdriver
- #1 Phillips screwdriver
- Small plastic scribe
- Flash BIOS update program CD

Turning Off Your Computer

 **CAUTION:** To avoid losing data, save and close all open files and exit all open programs before you turn off your computer.

1. Shut down the operating system:

- In Windows Vista :

Click **Start** , then click the arrow in the lower-right corner of the **Start** menu as shown below, and then click **Shut Down**.



- In Windows XP:

Click **Start** → **Turn Off Computer** → **Turn Off** . The computer turns off after the operating system shutdown process is complete.

2. Ensure that the computer and all attached devices are turned off. If your computer and attached devices did not automatically turn off when you shut down your operating system, press and hold the power button for about 4 seconds to turn them off.

After Working Inside Your Computer

After you complete any replacement procedure, ensure you connect any external devices, cards, and cables before turning on your computer.

 **CAUTION:** To avoid damage to the computer, use only the battery designed for this particular Dell computer. Do not use batteries designed for other Dell computers.

1. Connect any external devices, such as a port replicator, battery slice, or media base, and replace any cards, such as an ExpressCard.
2. Connect any telephone or network cables to your computer.

 **CAUTION: To connect a network cable, first plug the cable into the network device and then plug it into the computer.**

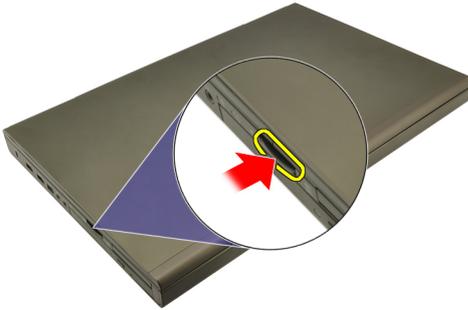
3. Replace the battery.
4. Connect your computer and all attached devices to their electrical outlets.
5. Turn on your computer.

Secure Digital (SD) Card

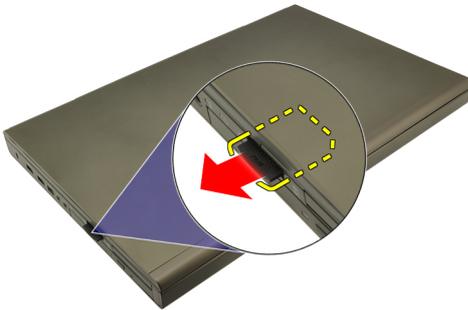
2

Removing The Secure Digital (SD) Card

1. Follow the procedures in *Before Working On Your Computer*
2. Press in the Secure Digital (SD) memory card to release it.



3. Slide the SD memory card out of the computer.



Installing The Secure Digital (SD) Card

1. Locate the Secure Digital (SD) memory card compartment on the left side of the chassis.
2. Push the SD memory card into the compartment until it is fully engaged with a click sound.

ExpressCard

3

Removing The ExpressCard

1. Follow the procedures in *Before Working On Your Computer*.
2. Press in on the ExpressCard gently to release it from the computer.



3. Grasp the ExpressCard and pull out to release from the system.



Installing The ExpressCard

1. Slide the expressCard into its slot until it clicks into place.
2. Follow the procedures in *After working inside your computer*.

Battery

4

Removing The Battery

1. Follow the procedures in *Before Working On Your Computer*.
2. Slide the battery release latch into the unlock position.



3. Remove the battery from the system.



Installing The Battery

1. Slide the battery back into the system.
2. The battery release latch will automatically click back to the locked position.
3. Follow the procedures in *After Working Inside Your Computer*.

Subscriber Identity Module (SIM) Card

5

Removing The Subscriber Identity Module (SIM) Card

1. Follow the procedures in *Before Working On Your Computer*.
2. Remove the *Battery*.
3. Slide the Subscriber Identity Module (SIM) card outward away from the slot.



4. Pull out the SIM from the slot.



Installing The Subscriber Identity Module (SIM) Card

1. Locate the Subscriber Identity Module (SIM) card slot in the battery compartment.
2. Push the SIM card into the slot until it is fully engaged.
3. Replace the *Battery*.
4. Follow the procedures in *After Working Inside Your Computer*.

Bluetooth Card

6

Removing The Bluetooth Card

1. Follow the procedures in *Before Working On Your Computer*
2. Remove the *Battery*.
3. Slide the Bluetooth door upward and release from the slot.



4. Disconnect the Bluetooth cable from the Bluetooth card.



5. Remove the single screw securing the Bluetooth card in place.



6. Remove the Bluetooth card.



Installing The Bluetooth Card

1. Place the Bluetooth card on the Bluetooth door and align with the screw hole.
2. Tighten the single screw to secure the Bluetooth card in place.
3. Connect the Bluetooth cable to the Bluetooth card.
4. Locate the Bluetooth door compartment.
5. Slide the Bluetooth door onto the compartment until the tab is fully engaged.
6. Install the *Battery*.
7. Follow the procedures in *After Working Inside Your Computer*.

Base Cover

7

Removing The Base Cover

1. Follow the procedures in *Before Working On Your Computer*.
2. Remove the *Battery*.
3. Remove the screws that secure the base cover to the computer.



4. Press the rubber feet towards the rear of the system to disengage the bottom door.



5. Remove the base cover from the computer.



Installing The Base Cover

1. Slide the bottom door downwards and towards the front of the system.
2. Tighten the screws that secure the base cover to the computer.
3. Install the *Battery*.
4. Follow the procedures in *After Working Inside Your Computer*.

Keyboard Trim

8

Removing The Keyboard Trim

1. Follow the procedures in *Before Working On Your Computer*.
2. Remove the *Battery*.
3. Using a plastic scribe, pry under the keyboard trim to release it from the computer.



4. Work your way around the sides and bottom edge of the keyboard trim.



5. Lift up to remove the keyboard trim from the unit.



Installing The Keyboard Trim

1. Align the keyboard trim with the tabs on the top of the palm rest.
2. Press downwards along the bottom edge to latch on the tabs until clicks are heard.
3. Work your way around the sides and top edge of the keyboard trim.
4. Install the *Battery*.
5. Follow the procedures in *After Working Inside Your Computer*.

Keyboard

9

Removing The Keyboard

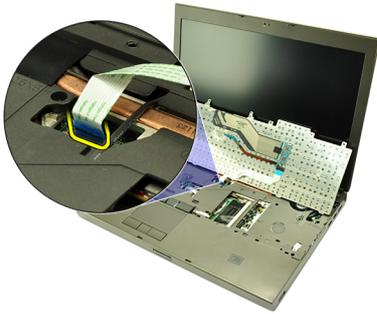
1. Follow the procedures in *Before Working On Your Computer*.
2. Remove the *Battery*.
3. Remove the *Keyboard trim*.
4. Remove the screws securing the keyboard in place.



5. Starting from the bottom of the keyboard, separate the keyboard from the system and turn the keyboard over.



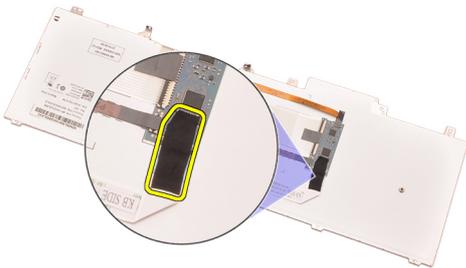
6. Disconnect the keyboard data cable from the system board.



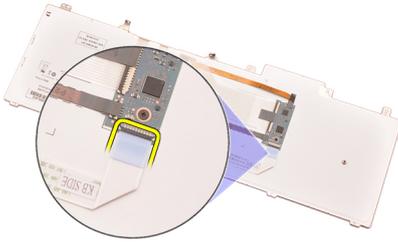
7. Remove the keyboard.



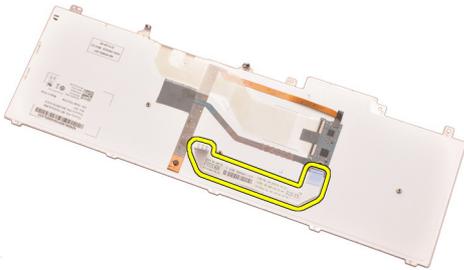
8. Peel back the adhesive tape securing the keyboard data cable to the back of the keyboard.



9. Disconnect the keyboard data cable from the back of the keyboard.



10. Peel the keyboard data cable away from the keyboard and remove.



Installing The Keyboard

1. Connect the keyboard data cable to the back of the keyboard.
2. Replace the adhesive tape to secure the keyboard data cable to the back of the keyboard.
3. Connect the keyboard data cable to the system board.
4. Place the keyboard on the palm rest and align the screw holes.
5. Tighten the keyboard screws.
6. Install the *keyboard Trim*.
7. Install the *battery*.
8. Follow the procedures in *After Working Inside Your Computer*.

Optical Drive

10

Removing The Optical Drive

1. Follow the procedures in *Before Working On Your Computer*.
2. Remove the *battery*.
3. Remove the *base cover*.
4. Remove the screw securing the optical drive in place.



5. Remove the optical drive from the computer.



6. Remove the screws securing the optical drive bracket.



7. Remove the optical drive bracket from the drive.



Installing The Optical Drive

1. Tighten the screws to secure the bracket to the back of the optical drive.
2. Slide the optical drive into the compartment on the right side of the chassis.
3. Tighten the screw to secure the optical drive to the computer.
4. Install the *base cover*.
5. Install the *battery*.
6. Follow the procedures in *After working inside your computer*.

Hard Drive

11

Removing The Hard Drive

1. Follow the procedures in *Before Working On Your Computer*.
2. Remove the *Battery*.
3. Remove the *Base Cover*.
4. Remove the screws securing the hard drive bracket in place.



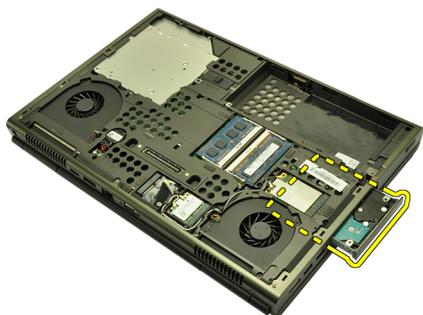
5. Remove the screw securing the hard drive latch in place.



6. Slide the hard drive release latch into the unlock position.



7. Remove the hard drive bracket from the system.



8. Flex the hard drive bracket outward and press the hard drive upwards from the bottom.



9. Remove the hard drive from the hard drive bracket.



Installing The Hard Drive

1. Align the hard drive to the hard drive bracket.
2. Slide the hard drive into the hard drive bracket.
3. Slide the hard drive onto its compartment towards the connector on the system board.
4. Tighten the screw securing the hard drive latch in place.
5. Tighten the screws securing the hard drive in place.
6. Install the *Base Cover*.
7. Install the *Battery*.
8. Follow the procedures in *After working inside your computer*.

Wireless Local Area Network (WLAN) Card

12

Removing The Wireless Local Area Network (WLAN) Card

1. Follow the procedures in *Before Working On Your Computer*.
2. Remove the *Battery*.
3. Remove the *Base Cover*.
4. Disconnect any antennas that may be connected to the WLAN card.



5. Remove the screw that secures the WLAN card to the computer.



6. Remove the WLAN card.



Installing The Wireless Local Area Network (WLAN) Card

1. Slide the WLAN card into its slot.
2. Tighten the single screw securing the WLAN card in place.
3. Connect the antennas according to the color code on the WLAN card.
4. Install the *Base Cover*.
5. Install the *Battery*.
6. Follow the procedures in *After Working Inside Your Computer*.

Wireless Wide Area Network (WWAN) Card

13

Removing The Wireless Wide Area Network (WWAN) Card

1. Follow the procedures in *Before Working On Your Computer*.
2. Remove the *Battery*.
3. Remove the *Base Cover*.
4. Disconnect any antennas that may be connected to the Wireless Wide Area Network (WWAN) card.



5. Remove the screw securing the WWAN in place.



6. Remove the WWAN card.



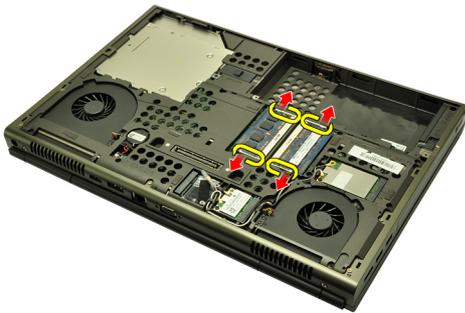
Installing The Wireless Wide Area Network (WWAN) Card

1. Slide the Wireless Wide Area Network (WWAN) card into its slot.
2. Tighten the screw securing the WWAN card in place.
3. Connect the antennas according to the color code on the WWAN card.
4. Install the *Base Cover*.
5. Install the *Battery*.
6. Follow the procedures in *After Working Inside Your Computer*.

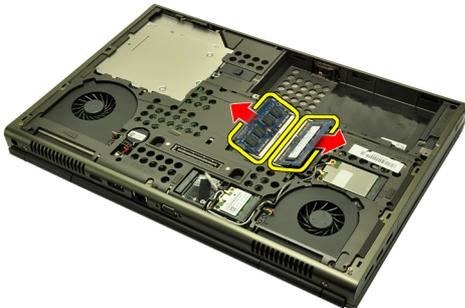
Primary Memory

Removing The Primary Memory

1. Follow the procedures in *Before Working On Your Computer*.
2. Remove the *Battery*.
3. Remove the *Base Cover*.
4. Gently pry the retention clips away from the memory modules.



5. Remove the memory modules from the computer.



Installing The Primary Memory

1. Locate the memory slot in the system.
2. Insert the memory into the memory socket.
3. Press down on the memory module until the securing clips secure the memory module in place.
4. Install the *Base Cover*.
5. Install the *Battery*.
6. Follow the procedures in *After Working Inside Your Computer*.

Secondary Memory

15

Removing The Secondary Memory

1. Follow the procedures in *Before Working On Your Computer*.
2. Remove the *Battery*.
3. Remove the *Keyboard Trim*.
4. Remove the *Keyboard*.
5. Gently pry the retention clips away from the memory module.



6. Remove the memory module from the computer.



7. Gently pry the retention clips away from the memory module.



8. Remove the memory module from the computer.

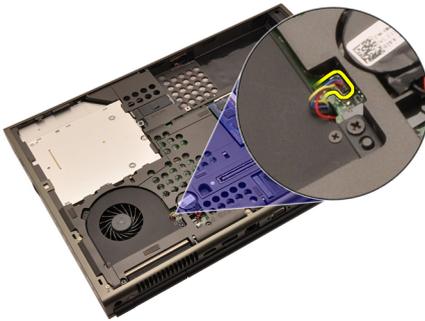


Installing The Secondary Memory

1. Locate the memory slot in the system.
2. Insert the memory module into the memory socket.
3. Press down on the memory module until the securing clips secure the memory in place.
4. Insert the memory module into the memory socket.
5. Press down on the memory module until the securing clips secure the memory module in place.
6. Install the *Keyboard*.
7. Install the *Keyboard Trim*.
8. Install the *Battery*.
9. Follow the procedures in *After Working Inside Your Computer*.

Removing The CPU Fan

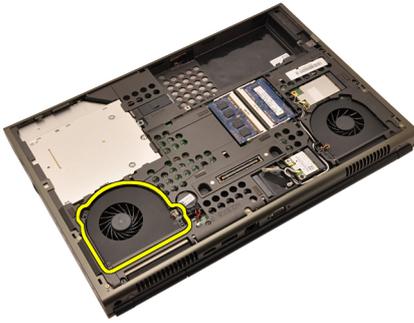
1. Follow the procedures in *Before Working On Your Computer*.
2. Remove the *Battery*.
3. Remove the *Base Cover*.
4. Disconnect the CPU fan cable.



5. Remove the screws securing the CPU fan in place.



6. Remove the CPU fan from the system.



Installing The CPU Fan

1. Locate the CPU fan compartment in the system.
2. Tighten the screws securing the CPU fan in place.
3. Connect the CPU fan cable.
4. Install the *Battery*.
5. Install the *Base Cover*.
6. Follow the procedures in *After Working Inside Your Computer*.

Graphics Card Fan

17

Removing The Graphics Card Fan

1. Follow the procedures in *Before Working On Your Computer*
2. Remove the *battery*.
3. Remove the *base cover*.
4. Disconnect the graphics card fan cable.



5. Remove the screws securing the graphics card fan in place.



6. Remove the graphics card fan from the system.



Installing The Graphics Card Fan

1. Locate the graphics card fan compartment in the system.
2. Tighten the two screws securing the graphics card fan in place.
3. Connect the graphics card fan cable.
4. Install the *battery*.
5. Install the *base cover*.
6. Follow the procedures in *After Working Inside Your Computer*.

Coin-Cell Battery

Removing The Coin—Cell Battery

1. Follow the procedures in *Before Working On Your Computer*
2. Remove the *Battery*.
3. Remove the *Base Cover*.
4. Disconnect the coin—cell battery.



5. Pry up the coin—cell battery from the adhesive.



6. Remove the coin—cell battery from the system.



Installing The Coin—Cell Battery

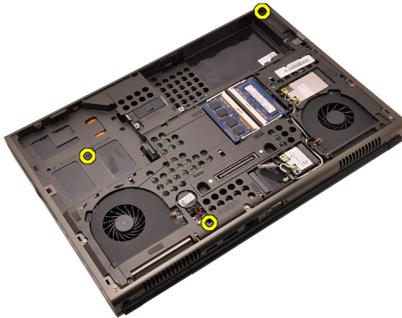
1. Attach the coin— cell battery to the coin cell compartment.
2. Connect the coin— cell battery to the system board.
3. Install the *Battery*.
4. Install the *Base Cover*.
5. Follow the procedures in *After Working Inside Your Computer*.

Palm Rest

19

Removing The Palm Rest

1. Follow the procedures in *Before Working On Your Computer*
2. Remove the *battery*.
3. Remove the *base cover*.
4. Remove the *keyboard trim*.
5. Remove the *keyboard*.
6. Remove the *optical drive*.
7. Remove the *hard drive*.
8. Remove the screws at the bottom of the computer.



9. Loosen the captive screw at the bottom of the system.



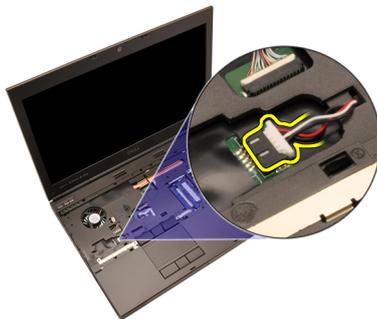
10. Remove the screws securing the palm rest.



11. Loosen the captive screws.



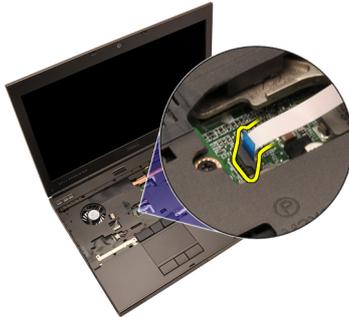
12. Disconnect the speaker cable.



13. Disconnect the media board cable.



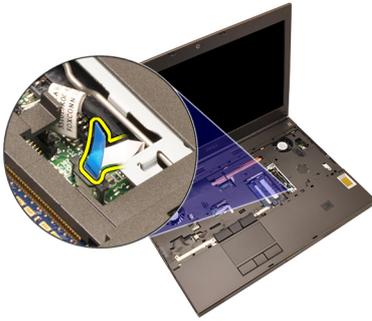
14. Disconnect the touchpad cable.



15. Disconnect the Radio Frequency Identification (RFID) cable.



16. Disconnect the fingerprint reader cable.



17. Disconnect the power button cable.



18. Lift up the left edge of the palm rest assembly.



19. Release the tabs along the edges of the palmrest.



20. Remove the palm rest.



Installing The Palm Rest

1. Align the two metal anchors at the bottom edge of the palm rest to the anchor hooks on the system.
2. Starting from the right edge of the palm rest, press downwards on the system to engage the tabs.
3. Work your way around the edges and ensure the tabs are fully engaged.
4. Connect all cables to the palm rest.
5. Press down on the memory module until the securing clips secure the memory module in place.
6. Tighten the captive screws securing the palm rest in place.
7. Tighten the screws securing the palm rest in place.
8. Tighten the screws on the bottom of the system securing the palm rest in place.
9. Install the *hard drive*.
10. Install the *optical drive*.
11. Install the *keyboard*.
12. Install the *keyboard trim*.
13. Install the *base cover*.
14. Install the *battery*.
15. Follow the procedures in *After Working Inside Your Computer*.

Removing The CPU Heatsink

1. Follow the procedures in *Before Working On Your Computer*.
2. Remove the *battery*.
3. Remove the *base cover*.
4. Remove the *keyboard trim*.
5. Remove the *keyboard*.
6. Remove the *optical disc drive*.
7. Remove the *hard drive*.
8. Remove the *CPU fan*.
9. Remove the *palm rest*.
10. Loosen the captive screws (1 > 2 > 3) on the heatsink.



11. Lift up the CPU heatsink and remove from the system.



Installing The CPU Heatsink

1. Locate the heatsink compartment on the system.
2. Tighten the captive screws (1 > 2 > 3). Ensure the heatsink is properly aligned and seated over the processor.
3. Install the *palm rest*.
4. Install the *CPU fan*.
5. Install the *hard drive*.
6. Install the *optical disc drive*.
7. Install the *keyboard*.
8. Install the *keyboard trim*.
9. Install the *base cover*.
10. Install the *battery*.
11. Follow the procedures in *After Working Inside Your Computer*.

Removing The Processor

1. Follow the procedures in *Before Working On Your Computer*.
2. Remove the *battery*.
3. Remove the *base cover*.
4. Remove the *keyboard trim*.
5. Remove the *keyboard*.
6. Remove the *optical drive*.
7. Remove the *hard drive*.
8. Remove the *CPU fan*.
9. Remove the *palm rest*.
10. Remove the *CPU heatsink*.
11. Rotate the processor cam lock in a counter-clockwise direction to the unlock position.



12. Remove the processor.



Installing The Processor

1. Insert the processor into the processor socket. Ensure the processor is properly seated.
2. Tighten the cam lock in a clockwise direction to the locked position.
3. Install the *CPU Heatsink*.
4. Install the *palm rest*.
5. Install the *CPU fan*.
6. Install the *hard drive*.
7. Install the *optical drive*.
8. Install the *keyboard*.
9. Install the *keyboard trim*.
10. Install the *base cover*.
11. Install the *battery*.
12. Follow the procedures in *After Working Inside Your Computer*.

Graphics Card Heatsink

22

Removing The Graphics Card Heatsink

1. Follow the procedures in *Before Working On Your Computer*
2. Remove the *battery*.
3. Remove the *base cover*.
4. Remove the *keyboard trim*.
5. Remove the *keyboard*.
6. Remove the *optical drive*.
7. Remove the *hard drive*.
8. Remove the *CPU fan*.
9. Remove the *palm rest*.
10. Remove the *CPU heatsink*.
11. Disconnect any antennas connected to installed wireless solutions.



12. Remove the antennas from the routing channels.



13. Loosen the four captive screws (1 > 2 > 3 > 4) on the heatsink.



14. Lift up the graphics card heatsink and remove from the system.



Installing The Graphics Card Heatsink

1. Locate the heatsink compartment on the computer.
2. Tighten the captive screws (1 > 2 > 3). Ensure the heatsink is properly aligned and seated over the graphics processor.
3. Tighten the screw securing the graphics card heatsink in place.
4. Connect the graphics card fan cable.
5. Push the antennas through the opening to the bottom of the computer.
6. Secure the antennas to the routing channels.
7. Connect the antennas to the installed wireless slots.
8. Install the *CPU heatsink*.
9. Install the *palm rest*.
10. Install the *CPU fan*.
11. Install the *secondary hard drive*.
12. Install the *primary hard drive*.
13. Install the *optical drive*.
14. Install the *keyboard*.
15. Install the *keyboard trim*.
16. Install the *base cover*.
17. Install the *battery*.
18. Follow the procedures in *After Working Inside Your Computer*.

Graphics Card

23

Removing The Graphics Card

1. Follow the procedures in *Before Working On Your Computer*.
2. Remove the *battery*.
3. Remove the *base cover*.
4. Remove the *keyboard trim*.
5. Remove the *keyboard*.
6. Remove the *optical drive*.
7. Remove the *hard drive*.
8. Remove the *CPU fan*.
9. Remove the *palm rest*.
10. Remove the *CPU heatsink*.
11. Remove the *graphics heatsink*.
12. Remove the two screws securing the graphics card in place.



13. Remove the graphics card.



Installing The Graphics Card

1. Locate the graphics card slot on the system.
2. Tighten the screws securing the graphics card in place.
3. Install the *graphics heatsink*.
4. Install the *CPU heatsink*.
5. Install the *palm rest*.
6. Install the *CPU fan*.
7. Install the *hard drive*.
8. Install the *optical drive*.
9. Install the *keyboard*.
10. Install the *keyboard trim*.
11. Install the *base cover*.
12. Install the *battery*.
13. Follow the procedures in *After Working Inside Your Computer*.

ExpressCard Module

24

Removing The ExpressCard Module

1. Follow the procedures in *Before Working On Your Computer*.
2. Remove the *battery*.
3. Remove the *base cover*.
4. Remove the *keyboard trim*.
5. Remove the *keyboard*.
6. Remove the *optical drive*.
7. Remove the *hard drive*.
8. Remove the *palm rest*.
9. Disconnect the ExpressCard cable.



10. Remove the screws securing the ExpressCard module in place.



11. Remove the ExpressCard module.



Installing The ExpressCard Module

1. Place the ExpressCard module in the system and tighten the three screws securing the ExpressCard module in place.
2. Connect the ExpressCard cable.
3. Install the *palm rest*.
4. Install the *hard drive*.
5. Install the *optical drive*.
6. Install the *keyboard*.
7. Install the *keyboard trim*.
8. Install the *base cover*.
9. Install the *battery*.
10. Follow the procedures in *After Working Inside Your Computer*.

Input/Output Board

25

Removing The Input/Output Board

1. Follow the procedures in *Before Working On Your Computer*.
2. Remove the *battery*.
3. Remove the *base cover*.
4. Remove the *keyboard trim*.
5. Remove the *keyboard*.
6. Remove the *optical drive*.
7. Remove the *hard drive*.
8. Remove the *palm rest*.
9. Disconnect the ExpressCard cable.



10. Remove the screws securing the Input/Output (I/O) board in place.



11. Lift the right edge of the I/O board upwards to disengage the connector and remove from the system.

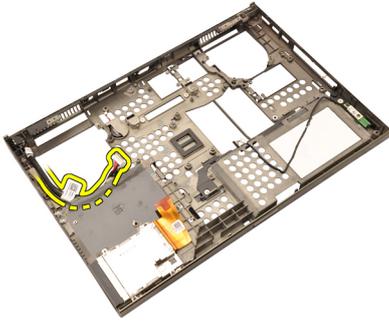


Installing The Input/Output Board

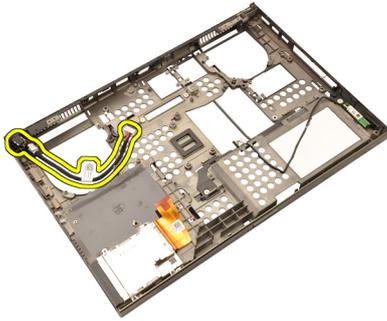
1. Place the Input/Output (I/O) board on the system and ensure the connector is properly engaged to the matching connector on the system board.
2. Tighten the single screw securing the I/O board in place.
3. Connect the ExpressCard cable.
4. Install the *palm rest*.
5. Install the *hard drive*.
6. Install the *optical drive*.
7. Install the *keyboard*.
8. Install the *keyboard trim*.
9. Install the *base cover*.
10. Install the *battery*.
11. Follow the procedures in *After Working Inside Your Computer*.

Removing The DC-in Jack

1. Follow the procedures in *Before Working On Your Computer*.
2. Remove the *battery*.
3. Remove the *base cover*.
4. Remove the *keyboard trim*.
5. Remove the *keyboard*.
6. Remove the *optical drive*.
7. Remove the *hard drive*.
8. Remove the *WLAN card*.
9. Remove the *WWAN card*.
10. Remove the *CPU fan*.
11. Remove the *graphics fan*.
12. Remove the *palm rest*.
13. Remove the *CPU heatsink*.
14. Remove the *graphics heatsink*.
15. Remove the *graphics card*.
16. Remove the *Input/Output board*.
17. Remove the *display assembly*.
18. Remove the *system board*.
19. Remove the DC-in cable from the routing channel.



20. Remove the DC-in jack.



Installing The DC-in Jack

1. Place the DC-in jack in the system.
2. Place the DC-in bracket in the system and tighten the single screw securing it in place.
3. Connect the DC-in cable to the system board.
4. Install the *Input/Output board*.
5. Install the *CPU heatsink*.
6. Install the *palm rest*.
7. Install the *CPU fan*.
8. Install the *hard drive*.
9. Install the *optical drive*.
10. Install the *keyboard*.
11. Install the *keyboard trim*.
12. Install the *base cover*.
13. Install the *battery*.
14. Follow the procedures in *After Working Inside Your Computer*.

Display Assembly

Removing The Display Assembly

1. Follow the procedures in *Before Working On Your Computer*.
2. Remove the *battery*.
3. Remove the *base cover*.
4. Remove the *keyboard trim*.
5. Remove the *keyboard*.
6. Remove the *optical drive*.
7. Remove the *hard drive*.
8. Remove the *palm rest*.
9. Disconnect any antennas connected to installed wireless solutions.



10. Remove the antennas from the routing channels.



11. Remove the screws at the bottom of the computer.



12. Remove the two screws at the rear of the computer.



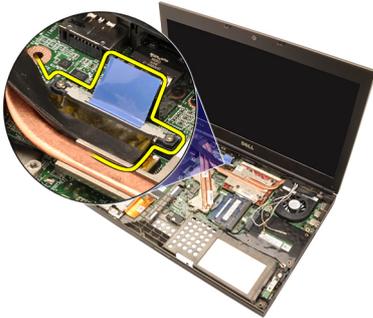
13. Pull the antennas through the opening to the top of the computer.



- 14.** Loosen the captive screws securing the Low-voltage Differential Signaling (LVDS) cable in place.



- 15.** Disconnect the LVDS cable.



- 16.** Disconnect the camera cable.



17. Remove the screws securing the display assembly in place.



18. Remove the display assembly.



Installing The Display Assembly

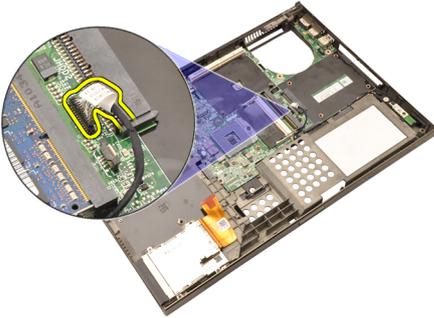
1. Attach the display assembly to the base of the computer.
2. Tighten the screws on the display assembly securing it in place.
3. Tighten the screws on the rear of the system securing the display assembly in place.
4. Tighten the screws on the bottom of the system securing the display assembly in place.
5. Connect the camera cable to the system board.
6. Connect the LVDS cable to the system board and tighten the two captive screws securing the LVDS cable in place.
7. Push the antennas through the opening to the bottom of the computer.
8. Secure the antennas to the routing channels.
9. Connect antennas to installed wireless solutions.
10. Install the *palm rest*.
11. Install the *hard drive*.
12. Install the *optical drive*.
13. Install the *keyboard*.
14. Install the *keyboard trim*.
15. Install the *base cover*.
16. Install the *battery*.
17. Follow the procedures in *After Working Inside Your Computer*.

Removing The System Board

1. Follow the procedures in *Before Working On Your Computer*.
2. Remove the *Secure Digital (SD) card*.
3. Remove the *battery*.
4. Remove the *base cover*.
5. Remove the *keyboard trim*.
6. Remove the *keyboard*.
7. Remove the *optical drive*.
8. Remove the *hard drive*.
9. Remove the *WLAN card*.
10. Remove the *WWAN card*.
11. Remove the *primary memory*.
12. Remove the *secondary memory*.
13. Remove the *CPU fan*.
14. Remove the *graphics fan*.
15. Remove the *palm rest*.
16. Remove the *CPU heatsink*.
17. Remove the *processor*.
18. Remove the *graphics heatsink*.
19. Remove the *graphics card*.
20. Remove the *Input/Output board*.
21. Remove the *display assembly*.
22. Disconnect the coin—cell battery cable.



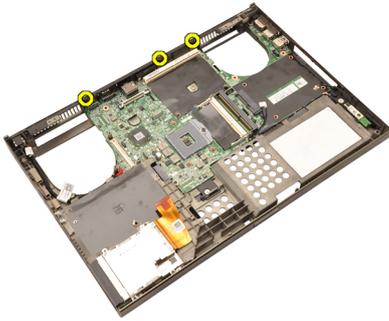
23. Disconnect the Bluetooth cable on the top side of the system board.



24. Disconnect the wireless switch cable.



25. Remove the screws securing the hinge cover in place.



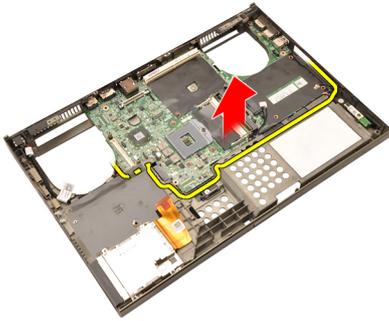
26. Remove the hinge cover.



27. Remove the screws securing the system board in place.



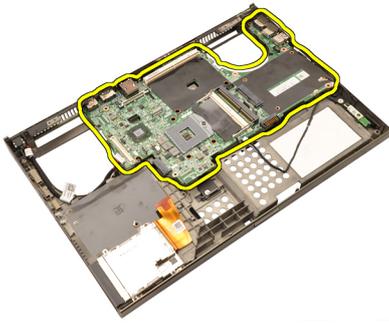
28. Gently lift the bottom edge of the system board assembly and raise it to a 20-degree angle.



29. Disconnect the DC-in cable.



30. Remove the system board.



Installing The System Board

1. Align the system board to the port connectors on the rear of the chassis and place the system board in the computer.
2. Tighten the screws securing the system board in place.
3. Connect the DC-in cable.
4. Connect the Bluetooth cable
5. Connect the wireless switch.
6. Connect the coin—cell battery on the bottom side of the computer.
7. Install the *display assembly*.
8. Install the *Input/Output board*.
9. Install the *graphics card*.
10. Install the *graphics card heatsink*.
11. Install the *processor*.
12. Install the *CPU heatsink*.
13. Install the *palm rest*.
14. Install the *graphics card fan*.
15. Install the *CPU fan*.
16. Install the *secondary memory*.
17. Install the *primary memory*.
18. Install the *WWAN card*.
19. Install the *WLAN card*.
20. Install the *hard drive*.
21. Install the *optical drive*.
22. Install the *keyboard*.
23. Install the *keyboard trim*.
24. Install the *base cover*.
25. Install the *battery*.
26. Follow the procedures in *After Working Inside Your Computer*.

Touchscreen Display Bezel

29

Removing The Touchscreen Display Bezel

1. Follow the procedures in *Before Working On Your Computer*.
2. Remove the *battery*.
3. Remove the screw covers.



4. Remove the screws securing the display bezel in place.



5. Carefully pry up the top edge of the display bezel.



6. Pry up the left edge of the display bezel.



7. Pry up the bottom edge of the display bezel.



8. Work your way around the right edge of the display bezel.



9. Remove the display bezel.



Installing The Touchscreen Display Bezel

1. Place the display bezel on the computer.
2. Starting from the bottom edge, press downward on the display bezel to engage the tabs.
3. Work your way around the sides and top edge.
4. Tighten the screws securing the display bezel in place.
5. Replace the screw covers.
6. Install the *battery*.
7. Follow the procedures in *After Working Inside Your Computer*.

Touchscreen Display Panel

30

Removing The RGB Display Panel

1. Follow the procedures in *Before Working On Your Computer*.
2. Remove the *battery*.
3. Remove the *touchscreen display bezel*.
4. Remove the screws on the left side securing the display panel in place. The screws are partially hidden by the cables. Lift up the cables before removing the screws.



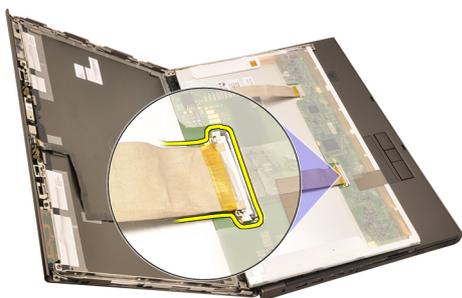
5. Remove the screws on the right side securing the display panel in place.



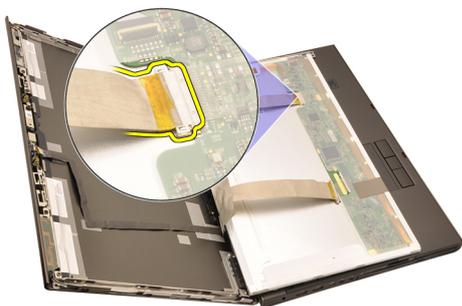
6. Flip over the display panel.



7. Peel back the adhesives and disconnect the low-voltage differential signaling (LVDS) cable from the back of the display panel.



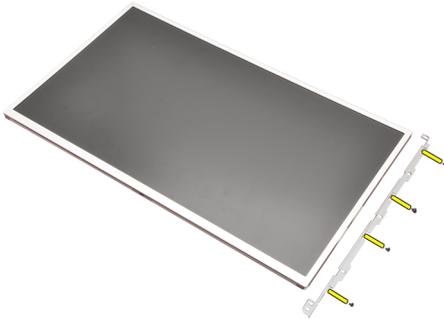
8. Peel back the adhesives and disconnect the RGB cable from the back of the display panel.



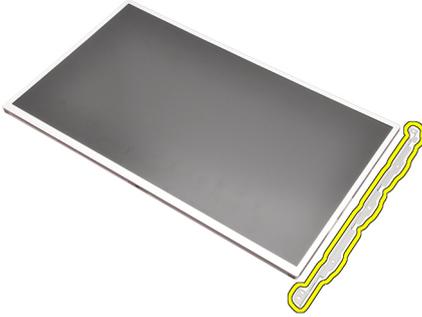
9. Remove the display panel from the display assembly.



10. Remove the screws securing the display bracket to the display panel.



11. Remove the display bracket.



Installing the RGB Display Panel

1. Align the display bracket with the display panel and tighten the screws securing the display bracket in place.
2. Connect the Low-voltage Differential Signaling (LVDS) cable to the back of the display panel and replace the adhesives securing the LVDS cable in place.
3. Connect the RGB cable to the back of the display panel and replace the adhesives securing the RGB cable in place.
4. Tighten the screws securing the display panel in place.
5. Tighten the screws on the left side of the display panel securing the display panel in place.
6. Install the *touch screen display bezel*.
7. Install the *battery*.
8. Follow the procedures in *After Working Inside Your Computer*.

Removing The Touchscreen Display Panel

1. Follow the procedures in *Before Working On Your Computer*.
2. Remove the *battery*.
3. Remove the *touchscreen display bezel*.
4. Remove the screws on the left side securing the display panel in place. The screws are partially hidden by the cables. Lift up the cables before removing the screws.



5. Remove the screws on the right side securing the display panel in place.



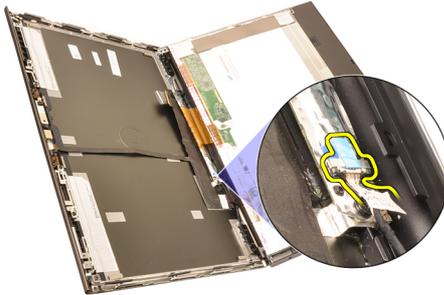
6. Flip over the display panel.



7. Peel back the adhesives and disconnect the low-voltage differential signaling (LVDS) cable from the back of the display panel.



8. Disconnect the digitizer cable.



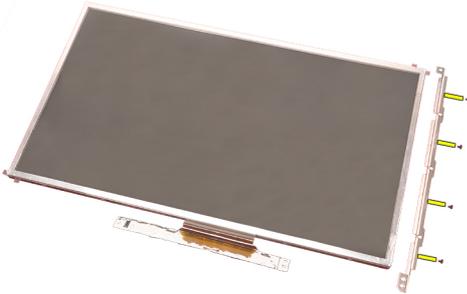
9. Remove the screws securing the digitizer in place.



10. Remove the touchscreen display panel.



11. Remove the screws securing the display bracket to the display panel.



12. Remove the display bracket.



Installing The Touchscreen Display Panel

1. Align the display bracket with the display panel and tighten the four screws securing the display bracket in place.
2. Place the digitizer board in the computer.
3. Tighten the screws securing the digitizer board in place.
4. Connect the digitizer cable.
5. Connect the low-voltage differential signaling (LVDS) cable to the back of the display panel and replace to adhesives securing the LVDS cable in place.
6. Tighten the screws securing the display panel in place.
7. Tighten the screws on the left side of the display panel securing the display panel in place.
8. Install the *touchscreen display bezel*.
9. Install the *battery*.
10. Follow the procedures in *After Working Inside Your Computer*.

Display Bezel

Removing The Non-Touchscreen Display Bezel

1. Follow the procedures in *Before Working On Your Computer*.
2. Remove the *battery*.
3. Carefully pry up the top edge of the display bezel.



4. Work your way around the bottom edge and sides of the display bezel and remove the display bezel.



Installing The Non-Touchscreen Display Bezel

1. Place the display bezel on the computer.
2. Starting from the bottom edge, press downward on the display bezel to engage the tabs.
3. Work your way around the sides and top edge.
4. Tighten the screws securing the display bezel in place.
5. Replace the screw covers.
6. Install the *battery*.
7. Follow the procedures in *After Working Inside Your Computer*.

Display Panel

Removing The Non-Touchscreen Display Panel

1. Follow the procedures in *Before Working On Your Computer*.
2. Remove the *battery*.
3. Remove the *display bezel*.
4. Remove the screws on the right side securing the display panel in place. The screws are partially hidden by the cables. Lift up the cables before removing the screws.



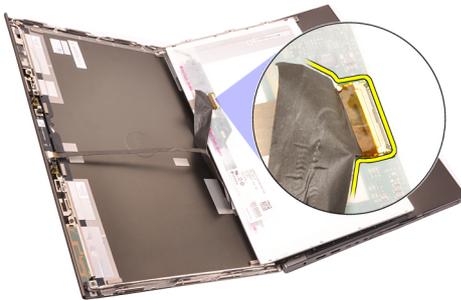
5. Remove the screws securing the display panel in place.



6. Flip over the display panel.



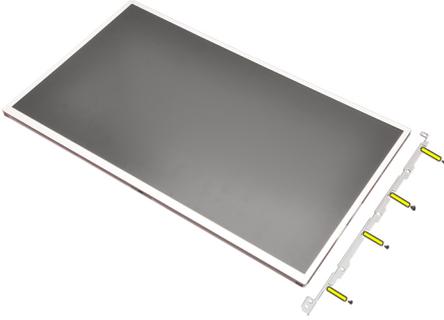
7. Peel back the adhesives and disconnect the low-voltage differential signaling (LVDS) cable from the back of the display panel.



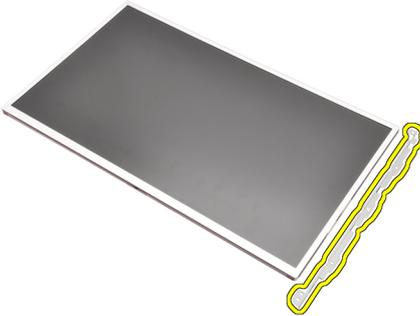
8. Remove the display panel from the display assembly.



9. Remove the screws securing the display bracket to the display panel.



10. Remove the display bracket.

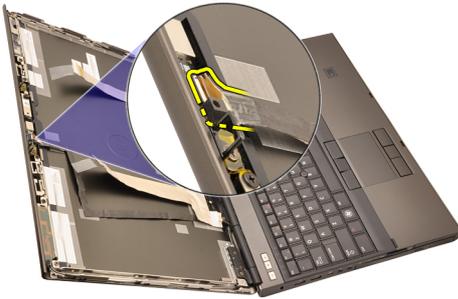


Installing The Non-Touchscreen Display Panel

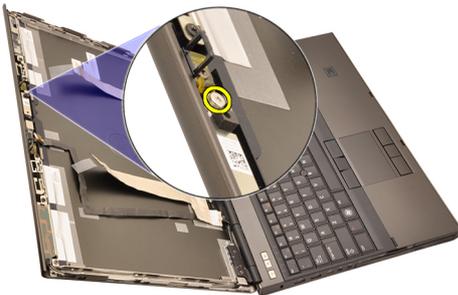
1. Align the display bracket with the display panel and tighten the screws securing the display bracket in place.
2. Connect the digitizer cable.
3. Connect the low-voltage differential signaling (LVDS) cable to the back of the display panel and replace the adhesives securing the LVDS cable in place.
4. Tighten the screws securing the display panel in place.
5. Tighten the screws on the left side of the display panel securing the display panel in place.
6. Install the *display bezel*.
7. Install the *battery*.
8. Follow the procedures in *After Working Inside Your Computer*.

Removing The Camera

1. Follow the procedures in *Before Working On Your Computer*
2. Remove the *battery*.
3. Remove the *standard display bezel* or the *touchscreen display bezel*.
4. Remove the *standard display panel* or the *touchscreen display panel*.
5. Disconnect the camera cable.



6. Loosen the screw securing the camera and microphone module.



7. Lift and remove the camera and microphone module.



Installing The Camera

1. Place the camera and microphone module on the display cover and tighten the screw securing the camera and microphone module in place.
2. Connect the camera cable to the camera and microphone module.
3. Install the *battery*.
4. Install the *standard display panel* or the *touchscreen display panel*.
5. Install the *standard display bezel* or the *touchscreen display bezel*.
6. Follow the procedures in *After Working Inside Your Computer*.

Display Hinge Cap Tower

34

Removing The Display Hinge Cap Tower

1. Follow the procedures in *Before Working On Your Computer*.
2. Remove the *battery*.
3. Remove the *base cover*.
4. Remove the *keyboard trim*.
5. Remove the *keyboard*.
6. Remove the *optical drive*.
7. Remove the *hard drive*.
8. Remove the *palm rest*.
9. Remove the *display assembly*.
10. Remove the *standard display bezel* or the *touchscreen display bezel*.
11. Remove the *standard display panel* or the *touchscreen display panel*.
12. Remove the screws securing the display hinges in place.



13. Remove the display hinge caps.



14. Remove the display hinges.



15. Release the display hinge towers from the cables and remove the hinge towers.



Installing The Display Hinge Cap Tower

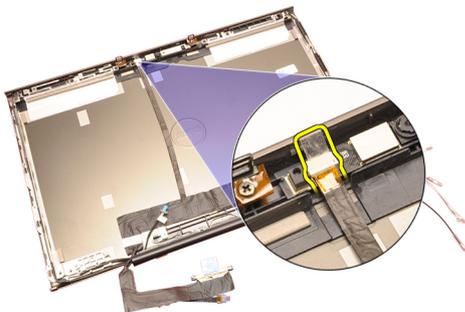
1. Insert the display hinge towers with the open end facing inward and ensure the cables and antennas are not pinched.
2. Insert the display hinges into the display hinge towers.
3. Insert the display hinge caps at the ends of the hinge towers.
4. Tighten the screws securing the display hinges in place.
5. Install the *standard display panel* or the *touchscreen display panel*.
6. Install the *standard display bezel* or the *touchscreen display bezel*.
7. Install the *display assembly*.
8. Install the *palm rest*.
9. Install the *hard drive*.
10. Install the *optical drive*.
11. Install the *keyboard*.
12. Install the *keyboard trim*.
13. Install the *base cover*.
14. Install the *battery*.
15. Follow the procedures in *After Working Inside Your Computer*.

Low-Voltage Differential Signaling (LVDS) Camera Cable

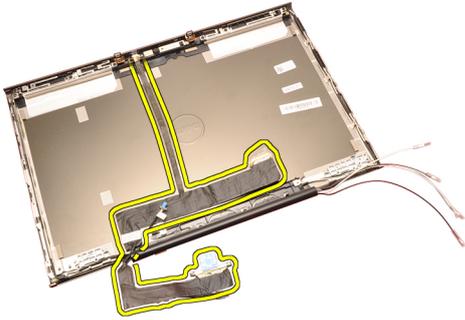
35

Removing The Low-Voltage Differential Signaling (LVDS) Camera Cable

1. Follow the procedures in *Before Working On Your Computer*.
2. Remove the *battery*.
3. Remove the *base cover*.
4. Remove the *keyboard trim*.
5. Remove the *keyboard*.
6. Remove the *optical drive*.
7. Remove the *hard drive*.
8. Remove the *palm rest*.
9. Remove the *display assembly*.
10. Remove the *standard display bezel* or the *touchscreen display bezel*.
11. Remove the *standard display panel* or the *touchscreen display panel*.
12. Remove the *display hinge, hinge cap, hinge tower*.
13. Disconnect the low-voltage differential signaling (LVDS) and camera cable from the camera.



14. Pry up the LVDS and camera cable from the display cover.



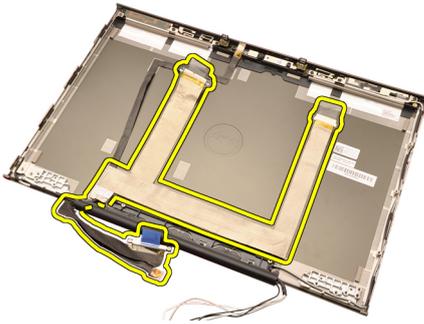
Installing The Low-Voltage Differential Signaling (LVDS) Camera Cable

1. Secure the low-voltage differential signaling (LVDS) cable to its routing channel.
2. Replace the adhesives to secure the LVDS and camera cable in place.
3. Connect the LVDS and camera cable to the camera.
4. Install the *display hinge, hinge cap, hinge tower*.
5. Install the *standard display panel* or the *touchscreen display panel*.
6. Install the *standard display bezel* or the *touchscreen display bezel*.
7. Install the *display assembly*.
8. Install the *palm rest*.
9. Install the *hard drive*.
10. Install the *optical drive*.
11. Install the *keyboard*.
12. Install the *keyboard trim*.
13. Install the *base cover*.
14. Install the *battery*.
15. Follow the procedures in *After Working Inside Your Computer*.

Removing The RGB Low-voltage Differential Signaling (LVDS) Cable

1. Follow the procedures in *Before Working On Your Computer*.
2. Remove the *battery*.
3. Remove the *base cover*.
4. Remove the *keyboard trim*.
5. Remove the *keyboard*.
6. Remove the *optical drive*.
7. Remove the *hard drive*.
8. Remove the *palm rest*.
9. Remove the *display assembly*.

cover and remove the LVDS cable.

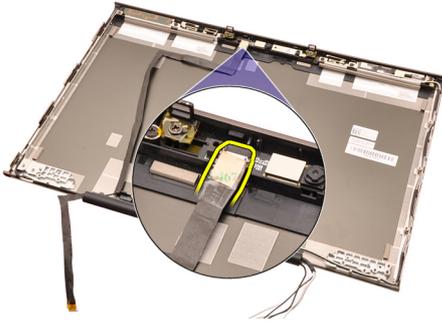


Installing The RGB Low-Voltage Differential Signaling (LVDS) Cable

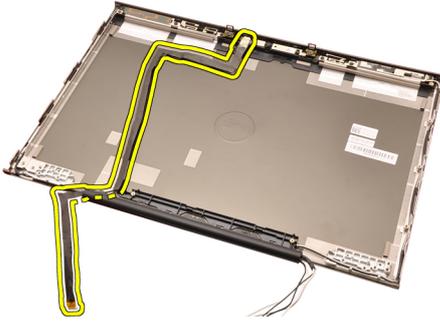
1. Place the low-voltage differential signaling (LVDS) cable on the display cover.
2. Replace the adhesives to secure the LVDS cable in place.
3. Install the *display hinge, hinge cap, hinge tower*
4. Install the *RGB display panel*.
5. Install the *touch screen display bezel*.
6. Install the *display assembly*.
7. Install the *palm rest*.
8. Install the *hard drive*.
9. Install the *optical drive*.
10. Install the *keyboard*.
11. Install the *keyboard trim*.
12. Install the *base cover*.
13. Install the *battery*.
14. Follow the procedures in *After Working Inside Your Computer*.

Removing The RGB Camera Cable

1. Follow the procedures in *Before Working On Your Computer*.
2. Remove the *battery*.
3. Remove the *base cover*.
4. Remove the *keyboard trim*.
5. Remove the *keyboard*.
6. Remove the *optical drive*.
7. Remove the *hard drive*.
8. Remove the *palm rest*.
9. Remove the *display assembly*.
10. Remove the *touch screen display bezel*.



15. Pry up the camera cable from the display cover and remove the camera cable.



Installing The RGB Camera Cable

1. Place the camera cable on the display cover.
2. Replace the adhesives to secure the camera cable in place.
3. Connect the camera cable to the camera and microphone module.
4. Install the *RGB Low-Voltage Differential Signaling (LVDS) cable*.
5. Install the *display hinge, hinge cap, hinge tower*.
6. Install the *RGB display panel*.
7. Install the *touch screen display bezel*.
8. Install the *display assembly*.
9. Install the *palm rest*.
10. Install the *hard drive*.
11. Install the *optical drive*.
12. Install the *keyboard*.
13. Install the *keyboard trim*.
14. Install the *base cover*.
15. Install the *battery*.
16. Follow the procedures in *After Working Inside Your Computer*.

Technical Specifications



NOTE: Offerings may vary by region. For more information regarding the configuration of your computer, click Start  (or Start in Windows XP) Help and Support, and then select the option to view information about your computer.

Processor

Processor type	<ul style="list-style-type: none">• Intel Core i5 and i7 Dual Core• Intel Core i7 Quad Extreme• Intel Core i7 Quad Core
L1 cache	Up to 256 KB cache depending on processor type
L2 cache	Up to 8 MB cache depending on processor type

Memory

Type	DDR3
Speed	1333 MHz and 1600 MHz (faster UI)

Connectors:

Intel Core i5 and i7 Dual Core processors two DIMM slots

Intel Core i7 Quad Core and i7 Quad Extreme processors four DIMM slots

Capacity 1 GB, 2 GB, 4 GB, and 8 GB

Minimum Memory 2 GB

Maximum memory:

Intel Core i5 and i7 Dual Core processors 16 GB

Intel Core i7 Quad Core and i7 Quad Extreme processors 32 GB

Video

Type	discrete
Data bus	integrated video
Video controller and memory:	
M4600	<ul style="list-style-type: none">• AMD FirePro M5950 Mobility Pro Graphics with 1 GB GDDR5• NVIDIA Quadro 1000M with 2 GB GDDR3• NVIDIA Quadro 2000M with 2 GB GDDR3
M6600	<ul style="list-style-type: none">• AMD FirePro M8900 Mobility Pro Graphics with 2 GB GDDR5• NVIDIA Quadro 3000M with 2 GB GDDR5• NVIDIA Quadro 4000M with 2 GB GDDR5• NVIDIA Quadro 5010M with 4GB GDDR5

Audio

Integrated	dual-channel High-Definition audio
------------	------------------------------------

Communication

Network adapter	network interface card capable of 10/100/1000 Mb/s communication
Wireless	<ul style="list-style-type: none">• internal wireless local area network (WLAN)• internal wireless wide area network (WWAN)• internal WiMax• Bluetooth wireless support

System Information

System Chipset	Mobile Intel QM67 Express Chipset
DMA Channels	two 82C37 DMA controllers with seven independently programmable channels

System Information

Interrupt Levels	Integrated I/O APIC capability with 24 interrupts
BIOS Chip (NVRAM)	8 Mb (256 KB)

Expansion Bus

Bus Type	PCI 2.3, PCI Express 1.0, SATA 1.0A and 2.0, USB 2.0
Bus Speed	PCIe X16
BIOS Chip (NVRAM)	8 Mb (256 KB)

External Connectors

Audio	two connectors for line-out and line-in/microphone
Network Adapter	one RJ45 connector
USB 2.0	two
USB 3.0	two
eSATA\USB 2.0	one
IEEE	one 4-pin IEEE connector
Video	15-pin VGA connector, 19-pin HDMI connector, 2-pin DisplayPort connector

Battery

Type	lithium ion
------	-------------



NOTE: The Dell Precision M6600 Mobile Workstation only supports a 9-cell battery.

Dimensions (6-cell / 9-cell / 9-cell long cycle life (LCL)):

Depth	80 mm (3.14 inches)
Height	190 mm (7.48 inches)
Width	20 mm (0.78 inches)
Weight	

Battery

	365 g (0.80 lb) (6-cell)
	500 g (1.10 lb) (9-cell / 9-cell LCL)
Voltage	11.10 V
Temperature range:	
Operating	0 °C to 35 °C (32 °F to 95 °F)
Non-operating	-40 °C to 65 °C (-40 °F to 149 °F)
Coin-cell battery	3 V CR2032 lithium ion cell

AC Adapter	M4600	M6600
Input voltage	100 VAC to 240 VAC	100 VAC to 240 VAC
Input current (maximum)	2.50 A	3.50 A
Input frequency	50 Hz to 60 Hz	50 Hz to 60 Hz
Output power	180 W	240 W
Output current	9.23 A	12.30 A
Rated output voltage	19.50 VDC	19.50 VDC
Dimensions:	180 W	240 W
Height	30 mm (1.18 inches)	25.40 mm (1 inch)
Width	155 mm (6.10 inches)	200 mm (7.87 inches)
Depth	76 mm (2.99 inches)	100 mm (3.93 inches)
Temperature range:		
Operating	0 °C to 40 °C (32 °F to 104 °F)	
Non Operating	-40 °C to 65 °C (-40 °F to 149 °F)	

Contactless Smart Card

Supported Smart Cards and Technologies	ISO14443A — 160 kbps, 212 kbps, 424 kbps, and 848 kbps
	ISO14443B — 160 kbps, 212 kbps, 424 kbps, and 848 kbps

Contactless Smart Card

ISO15693
HID iClass
FIPS201
NXP Desfire

Physical	M4600	M6600
Height	36.5 mm (1.44 inches)	37.20 mm (1.46 inches)
Width	376 mm (14.80 inches)	416.70 mm (16.41 inches)
Depth	256 mm (10.08 inches)	270.60 mm (10.65 inches)
Weight (Minimum)	2.77 kg (6.11 lb with 6-cell and airbay)	3.52 kg (7.77 lb with 9-cell and airbay)

Environmental

Temperature range:

Operating	0 °C to 35 °C (32 °F to 95 °F)
Storage	-40 °C to 65 °C (-40 °F to 149 °F)

Relative humidity (maximum):

Operating	10 % to 90 % (non-condensing)
Storage	5 % to 95 % (non-condensing)

Maximum vibration:

Operating	0.66 GRMS
Storage	1.3 GRMS

Maximum shock:

Operating	140 G
Storage	163 G

Altitude:

Operating	-15.2 m to 3048 m (-50 ft to 10,000 ft)
Storage	-15.2 m to 10668 m (-50 ft to 35,000 ft)

Environmental

Airborne contaminant level

G1 or lower as defined by ANSI/ISA-S71.04-1985

System Setup Overview

System Setup allows you to:

- change the system configuration information after you add, change, or remove any hardware in your computer.
- set or change a user-selectable option such as the user password.
- read the current amount of memory or set the type of hard drive installed.

Before you use System Setup, it is recommended that you write down the System Setup screen information for future reference.

 **CAUTION:** Unless you are an expert computer user, do not change the settings for this program. Certain changes can cause your computer to work incorrectly.

Entering System Setup

1. Turn on (or restart) your computer.
2. When the blue DELL logo is displayed, you must watch for the F2 prompt to appear.
3. Once the F2 prompt appears, press <F2> immediately.

 **NOTE:** The F2 prompt indicates that the keyboard has initialized. This prompt can appear very quickly, so you must watch for it to display, and then press <F2> . If you press <F2> before you are prompted, this keystroke will be lost.

4. If you wait too long and the operating system logo appears, continue to wait until you see the Microsoft Windows desktop. Then, shut down your computer and try again.

System Setup Menu Options

The following sections describe the menu options for the System Setup program

General

The following table describe the menu options of the **General** menu.

Option	Description
System Information	<p>This section lists the primary hardware features of your computer.</p> <ul style="list-style-type: none"> • System Information • Memory Information • Processor Information • Device Information
Battery Information	<p>Displays the battery status and the type of AC adapter connected to the computer.</p>
Boot Sequence	<p>Allows you to change the order in which the computer attempts to find an operating system.</p> <ul style="list-style-type: none"> • Diskette Drive • Internal HDD • USB Storage Device • CD/DVD/CD-RW Drive • Onboard NIC • Cardbus NIC <p>You can also select the Boot List option. The options are:</p> <ul style="list-style-type: none"> • Legacy • UEFI
Date/Time	<p>Allows you to change the date and time.</p>

System Configuration

The following table describe the menu options of the **System Configuration** menu.

Option	Description
 NOTE: System Configuration contains options and settings related to integrated system devices. Depending on your computer and installed devices, the items listed in this section may or may not appear.	
Integrated NIC	<p>Allows you to configure the integrated network controller. The options are:</p>

Option	Description
System Management	<ul style="list-style-type: none"> • Disabled • Enabled • Enabled w/PXE <p>Default Setting: Enabled w/PXE</p> <p>Allows you to control the systems management mechanism. The options are:</p> <ul style="list-style-type: none"> • Disabled • DASH/ASF 2.0 <p>Default Setting: DASH/ASF 2.0</p>
Parallel Port	<p>Allows you to configure the parallel port on the docking station. The options are:</p> <ul style="list-style-type: none"> • Disabled • AT • PS2 • ECP <p>Default Setting: AT</p>
Serial Port	<p>Allows you to configure the integrated serial port. The options are:</p> <ul style="list-style-type: none"> • Disabled • COM1 • COM2 • COM3 • COM4 <p>Default Setting: COM1</p>
SATA Operation	<p>Allows you to configure the internal SATA hard-drive controller. The options are:</p> <ul style="list-style-type: none"> • Disabled • ATA • AHCI • RAID On <p>Default Setting: RAID On</p>

Option	Description
USB Controller	 NOTE: SATA is configured to support RAID mode. Allows you to control the USB controller. The options are: <ul style="list-style-type: none"> • Enable Boot Support • Enable External USB Port Default Setting: Enable USB Controller and Enable External USB Port
Miscellaneous Devices	Allows you to enable or disable the following devices: <ul style="list-style-type: none"> • Internal Modem • Microphone • eSATA Ports • Hard Drive Free Fall Protection • Module Bay • ExpressCard • Camera You can also enable or disable: <ul style="list-style-type: none"> • Media Card and 1394 • Enable Media Card only • Disable Media Card and 1394 Default Setting: Media Card and 1394.
Keyboard illumination	Allows you to configure the keyboard illumination feature. The options are: <ul style="list-style-type: none"> • Disabled • Level is 25% • Level is 50% • Level is 75% • Levels is 100% Default Setting: Level is 25%
Drives	Allows you to configure the SATA drives on board. The options are:

Option	Description
	<ul style="list-style-type: none"> • SATA-0 • SATA-1 • SATA-4 • SATA-5 <p>Default Setting: All drives are enabled.</p>

Video

The following table describe the menu options of the **Video** menu.

Option	Description
LCD Brightness	Allows you to set the display brightness depending up on the power source (On Battery and On AC).
Enable Optimus	This option enables or disables the Nvidia Optimus Technology applicable to Windows 7 only.

Security

The following table describe the menu options of the **Security** menu.

Option	Description
Admin Password	<p>Allows you to set, change, or delete the administrator (admin) password.</p> <ul style="list-style-type: none">  NOTE: You must set the admin password before you set the system or hard drive password.  NOTE: Successful password changes take effect immediately.  NOTE: Deleting the admin password automatically deletes the system password and the hard drive password.  NOTE: Successful password changes take effect immediately. <p>Default Setting: Not set</p>

Option	Description
System Password	<p>Allows you to set, change, or delete the system password.</p> <p> NOTE: Successful password changes take effect immediately.</p> <p>Default Setting: Not set</p>
Internal HDD-0 Password	<p>Allows you to set or change the system's internal hard-disk drive.</p> <p> NOTE: Successful password changes take effect immediately.</p> <p>Default Setting: Not set</p>
Password Bypass	<p>Allows you to enable or disable the permission to bypass the System and the Internal HDD password, when they are set. The options are:</p> <ul style="list-style-type: none"> • Disabled • Reboot bypass <p>Default Setting: Disabled</p>
Password Change	<p>Allows you to enable the disable permission to the System and Hard Drive passwords when the admin password is set.</p> <p>Default Setting: Allow Non-Admin Password Changes is selected</p>
Strong Password	<p>Allows you to enforce the option to always set strong passwords.</p> <p>Default Setting: Disabled</p>
OROM Keyboard Access	<p>Allows you to set an option to enter the Option ROM Configuration screens using hotkeys during boot. The options are:</p> <ul style="list-style-type: none"> • Enable • One Time Enable • Disable <p>Default Setting: Enable</p>

Option	Description
TPM Security	<p>Allows you to enable the Trusted Platform Module (TPM) during POST.</p> <p>Default Setting: Disabled</p>
Computrace	<p>Allows you to activate or disable the optional Computrace software The options are:</p> <ul style="list-style-type: none"> • Deactivate • Disable • Activate <p> NOTE: The Activate and Disable options will permanently activate or disable the feature and no further changes will be allowed</p> <p>Default Setting: Deactivate</p>
CPU XD Support	<p>Allows you to enable the Execute Disable mode of the processor.</p> <p>Default Setting: Enabled</p>
Non-Admin Setup Changes	<p>Allows you to determine whether changes to the setup options are allowed when an Administrator Password is set. If disabled, the setup options are locked by the admin password.</p> <p>Default Setting: Disabled</p>
Password Configuration	<p>Allows you to determine the minimum and maximum length of Administrator and System passwords.</p>
Admin Setup Lockout	<p>Allows you to prevent users from entering Setup when an Administrator password is set.</p> <p>Default Setting: Disabled</p>

Performance

The following table describe the menu options of the **Performance** menu.

Option	Description
Multi Core Support	<p>Allows you to enable or disable multi-core support for the processor. The options are:</p> <ul style="list-style-type: none"> • All • 1 • 2 <p>Default Setting: All</p>
Intel SpeedStep	<p>Allows you to enable or disable the Intel SpeedStep feature.</p> <p>Default Setting: Enabled</p>
C-States Control	<p>Allows you to enable or disable the additional processor sleep states.</p> <p>Default Setting: The options C states, C3, C6, Enhanced C-states, and C7 options are selected/enabled.</p>
Limit CPUID	<p>Allows you to limit the maximum value the processor Standard CPUID Function will support.</p> <p>Default Setting: Enable CPUID Limit</p>
Intel TurboBoost	<p>Allows you to enable or disable the Intel TurboBoost mode of the processor.</p> <p>Default Setting: Enabled</p>
HyperThread Control	<p>Allows you to enable or disable the HyperThreading in the processor.</p> <p>Default Setting: Enabled</p>

Power Management

The following table describe the menu options of the **Power Management** menu.

Option	Description
AC Behavior	<p>Allows you to enable or disable the computer from turning on automatically when an AC adapter is connected.</p> <p>Default Setting: Disabled</p>

Option	Description
Auto On Time	<p>Allows you to set the time at which the computer must turn on automatically. The options are:</p> <ul style="list-style-type: none"> • Disabled • Every Day • Weekdays <p>Default Setting: Disabled</p>
USB Wake Support	<p>Allows you to enable USB devices to wake the system from Standby.</p> <p>Default Setting: Disabled</p> <p> NOTE: This feature is only functional when the AC power adapter is connected. If the AC power adapter is removed during Standby, the system setup will remove power from all of the USB ports to conserve battery power.</p>
Wireless Radio Control	<p>Allows you to enable or disable the feature that automatically switches from wired or wireless networks without depending on the physical connection.</p> <p>Default Setting: The options Control WLAN radio and Control WWAN radio are selected.</p>
Wake on LAN/WLAN	<p>This field allows the computer to power up from the off state when triggered by a special LAN signal or from Hibernate state when triggered by a special wireless LAN signal. Wake-up from the Standby state is unaffected by this setting and must be enabled in the operating system. This feature only works when the computer is connected to AC power.</p> <ul style="list-style-type: none"> • Disabled — Does not allow the system to power on when it receives a wake-up signal from the LAN or wireless LAN.

Option	Description
ExpressCharge	<ul style="list-style-type: none"> • LAN Only — Allows the system to be powered on by special LAN signals. • WLAN Only — Allows the system to be powered on by special WLAN signals. • LAN or WLAN — Allows the system to be powered on by special LAN or wireless LAN signals. <p>Default Setting: Disabled</p> <p>Allows you to enable or disable the ExpressCharge feature. The options are:</p> <ul style="list-style-type: none"> • Standard • ExpressCharge <p>Default Setting: ExpressCharge</p>

POST Behavior

The following table describe the menu options of the **POST Behavior** menu.

Option	Description
Adapter Warnings	<p>Allows you to enable or disable the system setup (BIOS) warning messages when you use certain power adapters.</p> <p>Default Setting: Enable Adapter Warnings</p>
Keypad (Embedded)	<p>Allows you to choose one or two methods to enable the keypad that is embedded in the internal keyboard.</p> <ul style="list-style-type: none"> • Fn Key Only • By Num Lk <p>Default Setting: Fn Key Only</p>
Mouse/Touchpad	<p>Allows you to define how the system handles mouse and touchpad input. The options are:</p> <ul style="list-style-type: none"> • Serial Mouse • PS2 Mouse • Touchpad/PS-2 Mouse

Option	Description
Numlock Enable	<p>Default Setting: Touchpad/PS-2 Mouse</p> <p>Allows you to enable the Numlock option when the computer boots.</p> <p>Default Setting: Enable Numlock</p>
Fn Key Emulation	<p>Allows you to set the option where the <Scroll Lock> key is used to simulate the <Fn> key feature.</p> <p>Default Setting: Enable Fn Key Emulation</p>
POST HotKeys	<p>Allows you enable the sign-on screen message display indicating the keystroke sequence to access the System Setup option menu.</p> <p>Default Setting: Enable F12 Boot Option Menu</p>
Fastboot	<p>Allows to set the option to speed up the boot process. The options are:</p> <ul style="list-style-type: none"> • Minimal • Thorough • Auto <p>Default Setting: Thorough</p>

Virtualization Support

The following table describe the menu options of the **Virtualization Support** menu.

Option	Description
Virtualization	<p>Allows you to enable or disable the Intel Virtualization Technology.</p> <p>Default Setting: Enable Intel Virtualization Technology</p>
VT for Direct I/O	<p>Allows you to enable or disable Virtualization Technology for Direct I/O.</p> <p>Default Setting: Disabled</p>
Trusted Execution	<p>This option specifies whether a Measured Virtual Machine Monitor (MVMM) can</p>

Option	Description
	utilize the additional hardware capabilities provided by Intel Trusted Execution Technology. The TPM Virtualization Technology and Virtualization Technology for Direct I/O must be enabled to use this feature. Default Setting: Disabled

Wireless

The following table describe the menu options of the **Wireless** menu.

Option	Description
Wireless Switch	Allows to set the wireless devices that can be controlled by the wireless switch. The options are: <ul style="list-style-type: none"> • WWAN • WLAB • Bluetooth Default Setting: All the options are selected.
Wireless Device Enable	Allows you to enable or disable the wireless devices. Default Setting: All the options are selected.

Maintenance

Option	Description
Service Tag	Displays the Service Tag of your computer.  NOTE: If a Service Tag has not been set for this system, the computer will automatically bring up this screen when users enter the BIOS. You will be prompted to enter the Service Tag.
Asset Tag	Displays the Asset Tag.

System Logs

The following table describe the menu options of the **System Logs** menu.

Option	Description
BIOS Events	Allows you to view and clear the System Setup (BIOS) POST events.
DellDiag Events	Allows you to view and clear the DellDiag events.
Thermal Events	Allows you to view and clear the Thermal events.
Power Events	Allows you to view and clear the Power events.

Device Status Lights

-  Turns on when you turn on the computer and blinks when the computer is in a power management mode.
-  Turns on when the computer reads or writes data.
-  Turns on steadily or blinks to indicate battery charge status.
-  Turns on when wireless networking is enabled.

Battery Status Lights

If the computer is connected to an electrical outlet, the battery light operates as follows:

- **Alternately blinking amber light and blue light** — An unauthenticated or unsupported non-Dell AC adapter is attached to your laptop.
- **Alternately blinking amber light with steady blue light** — Temporary battery failure with AC adapter present.
- **Constantly blinking amber light** — Fatal battery failure with AC adapter present.
- **Light off** — Battery in full charge mode with AC adapter present.
- **Blue light on** — Battery in charge mode with AC adapter present.

Diagnostics

- *Device Status Lights*
- *Battery Status Lights*
- *LED Error Codes*

Device Status Lights



Turns on when you turn on the computer and blinks when the computer is in a power management mode.



Turns on when the computer reads or writes data.



Turns on steadily or blinks to indicate battery charge status.



Turns on when wireless networking is enabled.



Turns on when a card with Bluetooth wireless technology is enabled. To turn off only the Bluetooth wireless technology function, right-click the icon in the system tray and select Disable Bluetooth Radio.

Battery Status Lights

If the computer is connected to an electrical outlet, the battery light operates as follows:

- **Alternately blinking amber light and blue light** — An unauthenticated or unsupported non-Dell AC adapter is attached to your laptop.
- **Alternately blinking amber light with steady blue light** — Temporary battery failure with AC adapter present.
- **Constantly blinking amber light** — Fatal battery failure with AC adapter present.
- **Light off** — Battery in full charge mode with AC adapter present.
- **Blue light on** — Battery in charge mode with AC adapter present.

LED Error Codes

The following table shows the possible LED codes that may display when your computer is unable to complete a power on self test.

Diagnostic LED		Error Description
HDD/ Storage	Battery	Wireless
		
LED	LED	LED

Diagnostic LED			Error Description
Blinking	Solid	Solid	The microcontroller is handing control of the system to the processor. This code persists if no processor is detected.
	Solid	Blinking	The memory has encountered an error.
Blinking	Blinking	Blinking	A system board component is faulty.
Blinking	Blinking	Solid	The video card is preventing the system from completing POST.
Blinking	Blinking	Off	The keyboard is preventing the system from completing POST.
Blinking	Off	Blinking	The USB controller encountered a problem during initialization.
	Solid	Blinking	No SODIMMs are installed.
Blinking	Solid	Blinking	The LCD encountered a problem during initialization.
	Off	Blinking	The modem is preventing the system from completing POST.

Contacting Dell

39

Contacting Dell

To contact Dell for sales, technical support, or customer service issues:

1. Visit support.dell.com.
2. Verify your country or region in the **Choose a Country/Region** drop-down menu at the bottom of the page.
3. Click **Contact Us** on the left side of the page.
4. Select the appropriate service or support link based on your need.
5. Choose the method of contacting Dell that is convenient for you.

